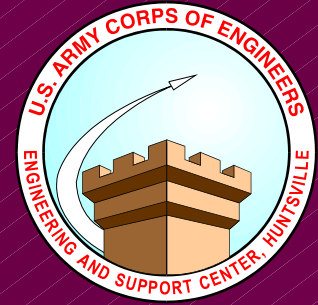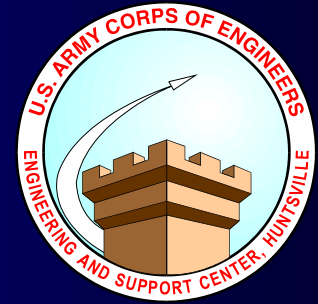# Area Cost Factors

To Empirically Measure the Cost of Building Construction at a Given Location Versus a National Average

ACF Uses

- **Planning**
- **Adjust Pricing Guide Unit Cost**
- **Adjust Historical Cost**
- **Parametric Estimating**

ACF Update Procedures

- **Contract Out Initial Survey**
  - **Contractor Responsible for Obtaining**
    - **Labor Rates**
    - **Material Rates (Two Quotes)**
  - **Govt Provides Equipment Rate Updates**
- **Reviewed by Tri-Services**
  - **Reviewed and Validated by Each Service**
  - **Recommend Changes Based Upon Actual Data**
- **Updated by Army Corps of Engineers**
- **Final Review by Tri-Service Cost Committee**
- **Approve and Release by OSD**
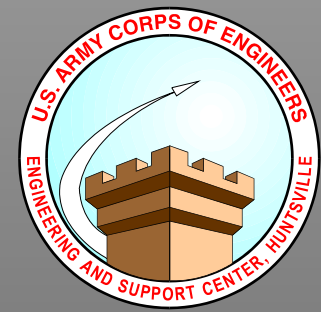
ACF Calculations

- **96 Base Cities - 2 Cities from Each of the 48 Contiguous States**
- **297 Survey Cities**
  - **210 U.S. Cities (Includes 96 Base Cities)**
  - **87 Foreign Cities**
- **456 ACF Locations**
  - **369 U.S. Cities**
  - **87 Foreign Locations**

ACF Calculations
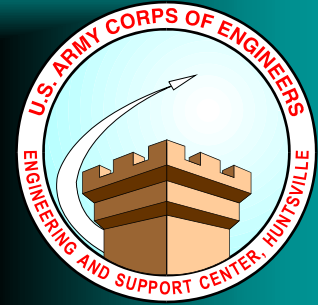
- **Labor, Material, & Equipment Indices**
  - **To cover definable actual cost items as related to construction. Includes 34 survey items:**
    - **Labor Rates (8 Categories)**
    - **Material Cost (18 Items)**
    - **Hourly Equipment Cost (4 Pieces)**

- **Matrix Factors**
  - **Covers the items which impact cost but cannot be directly defined by unit costs.**

Normalize & Weight Costs
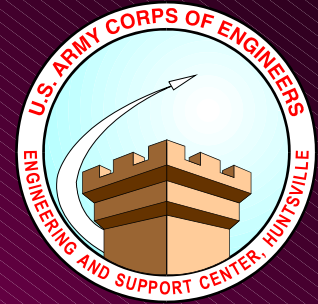
Normalize Cost

- **Calculate 96 Base City Average (BCA) for each of the 34 Surveyed Items**
- **At each of the 407 locations, divide each of the 34 surveyed items by its BCA**
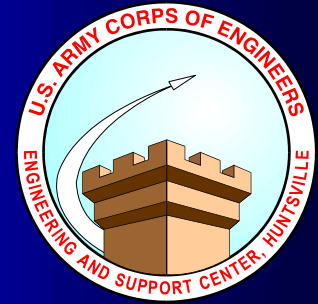
Weight Costs

- **Weighted Labor =**

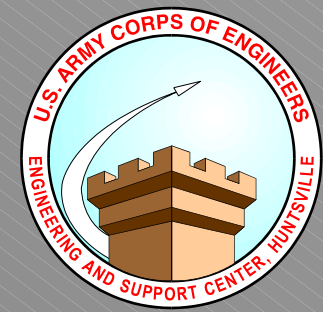   **Labor craft (1) /BCA craft (1) X craft (1) weight**

    " " (2) " " (2) " (2) "

    .

    .

    .

    Labor craft (10)/BCA craft (10) X craft (10) Weight

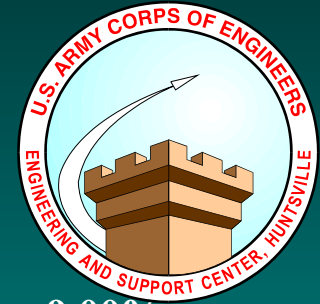 $$\sum = \text{Weighted Labor}$$

- **Repeat for Material and Equipment**

LME at a Survey Location

LME = 35% * Weighted Labor

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63% * Weighted Material

+   2% * Weighted Equipment

LME Index

Material Market Basket of Goods

- **Concrete-** Concrete ready mix, regular weight, 3000 psi — **9.00%**
- **Copper Pipe-** Pipe copper type L, no coupling no hanger 3/4" dia. — **5.00%**
- **Copper Wire-**Wire, 600 volt, type THWN-THHN, copper, stranded, # 12 — **7.50%**
- **Drywall-** Gypsum drywall, no finish included, on walls, std, 1/2" thk — **6.00%**
- **Ductwork-** Duct, fab rect, over 5000 lb, incl fittings, joints, supports, galv steel — **5.00%**
- **Electrical Conduit-** Conduit to 15' high, incl. couplings only, EMT, 3/4" — **3.50%**
- **Flooring -** Carpet, commercial, nylon 28 oz medium traffic — **5.00%**
    - Marble Flooring, polished tiles, 12"x12"x3/8" thick, Thin Set
    - Resilient Vinyl Tile, 1/8" thick, marbleized
- **Insulation -** Wall insul, rigid, 2" thk, most common type — **4.00%**
- **Masonry Units -** Concrete block, back-up, 8" x 8" x 16", no scaf/reinf, 2000 psi — **7.00%**
    - Terra Cotta Partition or back-up blocks, scored in C.L. lots, load bearing 12" X 12", 8" thick, in walls
- **Paving -** Base course, 3/4" maximum size, 3" deep crushed stone, washed — **2.00%**
- **Plastic Pipe -** Pipe PVC sched 40 no coupling/hanger, 3" dia. — **5.00%**

Material Market Basket of Goods (cont.)
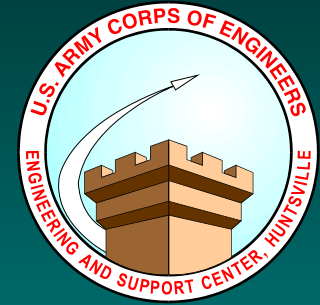
- **Plumbing Fixture** - Water closet, 2-pc vit china, open front solid plastic seat, supply w/stop, low vol — **7.00%**
- **Roofing Materials** - Steel roofing. on substrate, painted, 24 ga, 2" standing seam panel — **5.50%**
  - Asphalt shingles, 210-235 lb/sq, inorganic, Class A, std strip shingles
  - Built-up Roofing, asph flood ct w/grvl surf, 3 plies #15 felt, mppd, base sheet
  - Clay tile, w/acces, red, gr 1, Spanish, 171 pc/sq, ASTM C1167
- **Sheathing** - Sheathing, plywood on walls with exterior CDX, 1/2" thick — **4.00%**
- **Steel Pipe** - Pipe, steel, no coupling/hanger, 1" dia, sched 40, black, threaded — **5.00%**
- **Structural Steel** - Structural steel projects, 1 to 2 stories, apt/nursing homes, etc — **15.00%**
- **Wall Framing** - Framing, Metal, Stud Walls w/top & bottom tracks, 20 gauge x 3 5/8" wide. — **4.50%**

Labor Market Basket of Goods
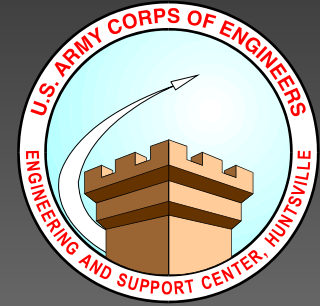
- **Brick Layer**   **10.00%**
- **Carpenter**   **23.00%**
- **Electrician**   **13.00%**
- **Iron Worker**   **11.00%**
- **Laborer**   **18.00%**
- **Operating Engineer (Crane)**   **3.00%**
- **Plumber/Pipe Fitter**   **13.00%**
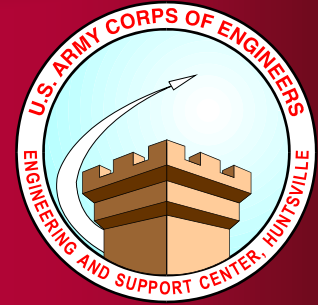- **Roofer Sheet Metal Worker**   **9.00%**
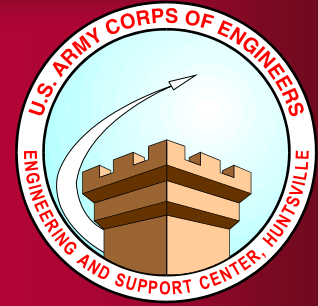
Matrix Factors

- **Location Design Factors**
    1. **Seismic**
    2. **Climatic (frost zone, wind loads, HVAC)**
- **Local Productivity**
    3. **Weather**
    4. **Labor Availability**
    5. **Contractor Profits**
    6. **Mobilization**
   7. **Productivity vs U.S. Standard**

Matrix Factor Seismic

- Attempts to measure the cost effects of the seismic design requirements.

- The areas of costs affected are: Foundations, Structural Frame, Concrete Block Walls, and HVAC System Support.

- The Seismic Matrix Factor is broken down into two parts, Seismic Design Category and the Seismic Risk Variable.

- Note: This Matrix Factor is based upon Type I facilities, for any facility type, other than Type I, need to consider additional costs for structural requirements and include in DD 1391.

- Note: This matrix factor does not take into consideration the possibility of liquification of the soil. If the soil conditions lend towards liquification during seismic activities, additional costs for foundations requirements may need to be added to the DD 1391.

Matrix Factor Climatic
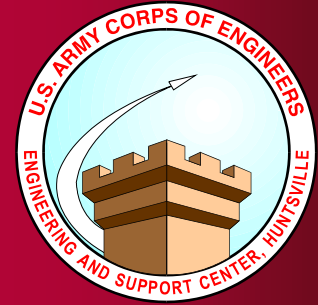
- Attempts to measure the effects which different climatic conditions have upon building design and cost. The specific areas being measured are:

  - Foundations – measuring the depth of the foundation required in order to counter the effect of frost.

  - Exterior Envelope – identifies the thermal capacity (i.e., insulation levels) required in order to efficiently heat/cool the facility

  - Structure – takes into account the effect of snow load requirements for roofing structures and the effects of wind loads on the exterior bracing

  - HVAC Systems – considers the level of heating and cooling required based upon climate.

Matrix Factor Weather
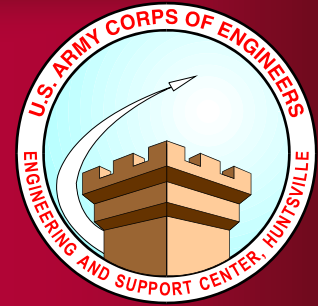
- Attempts to measure the effects weather has on the overall construction cost for the facility. Includes:
  - labor productivity (i.e. the speed of work, absenteeism, etc.)
  - the effect of seasonal weather on the general contractor's site overheads (i.e. winter protection, temporary heating, insulation and protection of concrete work, snow clearing, etc.)
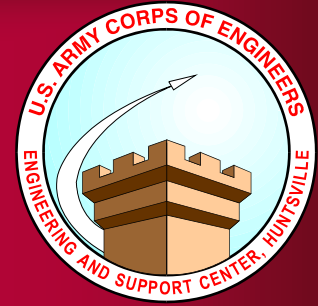
Matrix Factor
Labor Availability

- Attempts to measure the effects on cost due to labor surpluses or shortages at specific locations.
  - Condition Description
    - Above Normal Abundance of construction labor available in all trades. Condition characterized by strong bidding competition and overall unemployment levels in the 8% to 10% range and above.
    - Normal Supply/demand labor balance; normal competitive bidding; unemployment in 6% to 8% range.
    - Slightly Below Normal Intermittent shortages evident; reduced competitive bidders; unemployment 5% to 6%.
    - Substantially Below Normal Continuous shortages evident; intermittent press reports and commentary on problem; unemployment below 5%.
   - Extremely Below Normal Over-employment condition self-evident.

Matrix Factor Construction Profits
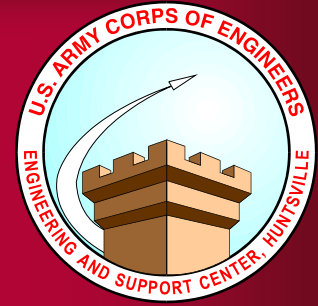
- Attempts to measure the effect on price exerted by the contractor's bidding strategies related to the level of competition and general market conditions.

- Assumes that the more competition normally experienced at a location will result in forcing the contractors to be more competitive by reducing their overhead and by using a smaller profit margin.

Matrix Factor - Life Support/Mobilization
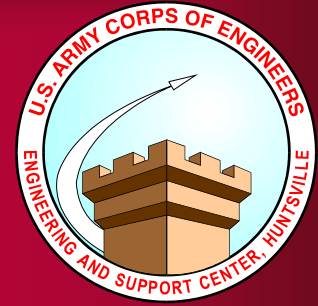
- Attempts to measure the cost effect which remoteness from sources of supply (materials, labor, equipment) and contactor interest has on prices. Since, the cost of transporting materials is already included in the Material Costs, this factor will attempt to measure:
  - Transportation, housing and subsistence of labor
  - Mobilization and demobilization of equipment
  - Extent of contractor interest

Matrix Factor Labor Productivity
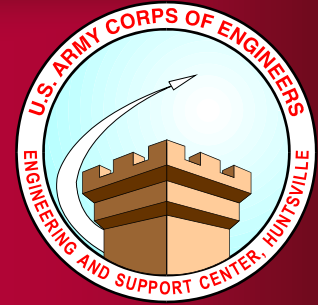
- The intent of this matrix factor is to distinguish between the productivity of the various labor forces used (productivity across the U.S. is considered to be the basis for establishing a 100% productivity status). For example, it allows the user to adjust the index for differences in productivity which may exist between Egyptian and Korean work forces. Published reliable data on labor productivity is difficult to find. The user should use this factor with caution since data is difficult to find. Refer to Table 13 for the list of acceptable Matrix Factor Values for Productivity.
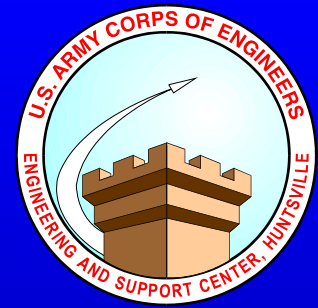
Total ACF

- **Overall Index = LME + MF**
  - **Overall index for base cities normalized to 1.00**
- **ACF = Overall Index /BC Avg.**